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2
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LIST OF PUBLICATIONS AND PATENTS WITH ABSTRACTS

Western Regional Research Laboratory
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FOOD PROCESSING
PECTIN
PROTEINS, PLASTICS, FIBERS, ETC.
ANTIBIOTIC SUBSTANCES
MISCELLANEOUS

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Bureau of Agricultural and Industrial Chemistry
Agricultural Research Administration
United States Department of Agriculture

FOOD PROCESSING

Apparatus for peeling onions, including a conical jet of gas. U. S. Patent 2,445,881 to G. T. Hemmeter. Patented July 27, 1948. Patent describes apparatus for peeling onions which involves subjecting onions to a conical, diverging, hollow jet of gas whereby the gas impinging on the surface of the onion first loosens the skin and then tears it away from the onion.

Bacteriology of slime in a citrus-processing plant, with special reference to coliforms. E. R. Wolford and J. A. Berry, Food Research 13(4):340-346, July-Aug., 1948. Tests made in a citrus juice processing plant revealed large numbers of bacteria in slime and debris on belts, elevators, and wash tank.

Dried egg powder. U. S. Patent 2,445,299 to M. M. Boggs and H. L. Fevold. Patented July 13, 1948. Describes process of preparing dried egg powder of superior shelf life and aeration properties. Process involves adding an acid to the egg emulsion, drying the acidified emulsion, then adding dry sodium bicarbonate to the dry, acidified egg emulsion. When the resulting powder is mixed with water for reconstitution and ultimate use, the bicarbonate neutralizes the acid added previous to drying.

Food value of soybean protein as related to processing. A. A. Klose, B. Hill, and H. L. Fevold, Food Tech. 2(3):201-206, July, 1948. Effect of variations in heat treatment and solvent extraction on soybean protein was studied in feeding experiments with rats. It was determined, for example, that treatment of raw soybeans with steam at 15 lbs. pressure for 10 to 15 minutes gave a product of maximum food value. Food values for hexane- and alcohol-extracted soybean flakes were essentially the same.

Studies on Clostridium botulinum in frozen pack vegetables. H. Ferry, C. T. Townsend, A. A. Andersen, and J. A. Berry, Food Tech. 2(3):180-190, July, 1948. The possibility of toxic spoilage of frozen pack vegetables was investigated. The authors report failure of a wide variety of frozen vegetables to become toxic when thawed and held at room temperature for 2 days. Data presented yield no evidence that hermetically sealed containers would introduce a public health hazard if used in freezing preservation of vegetables.

Oxygen absorption by dehydrated whole egg powders. B. Makower and T. M. Shaw. Indus. and Engin. Chem. 40(8):1433-1437, Aug., 1948. The initial rate of oxygen absorption by several dehydrated egg powders was measured as a function of temperature, oxygen pressure, specific surface and moisture content. These data in conjunction with other observations may be used to estimate extent of flavor change with time in egg powders exposed to oxygen.

Use of lyophilization in determination of moisture content of dehydrated vegetables. B. Makower and E. Nielsen, Analyt. Chem. 20(9):856-858, Sept., 1948. A new method for determining moisture content of dehydrated vegetables is described. The method involves addition of a large amount of water to the sample, followed by freezing, drying from the frozen state, and completion of drying in vacuum oven or desiccator.

Sanitation in frozen foods. J. A. Berry, Frozen Food Indus. 4(11):10, 19, Nov., 1948. A discussion of the precautions to be taken during food processing in order to obtain products of low bacterial count.

Pectic enzyme preparation fortified with pectinesterase. U. S. Patent 2,457,560 to E. F. Jansen and H. Lineweaver. Patented Dec. 28, 1948. Pectic enzyme preparations such as those used in clarification of fruit juices and wines are fortified by adding pectinesterase. The fortified enzyme preparation has greatly enhanced clarifying properties.

PECTIN

Distribution of molecular weights of pectin propionates. H. S. Owens, J. C. Miers, and W. D. Maclay, Jour. Colloid Science 3(4):277-291, Aug., 1948. A number of pectins were esterified to the corresponding propionates and fractionated according to molecular weight. The distribution of molecular weights was found to be a Gaussian rather than a logarithmic type. Application of viscosity equations indicates that esterified galacturonide chains in acetone are less rigid than galacturonide chains in aqueous solution.

Process of isolating low-methoxyl pectinic acids. U. S. Patent 2,448,818 to R. M. McCready, H. S. Owens, and W. D. Maclay. Patented Sept. 7, 1948. Method of isolating low-methoxyl pectinic acids from aqueous solutions thereof by adding an acid to the solution to a pH of 2 or less. The pectinic acids precipitate out and are separated, washed, and dried.

Production of low-methoxyl pectinic acids from aluminum-pectin compositions. U. S. Patent 2,457,577 to W. D. Maclay, A. D. Shepherd, R. M. McCready, and R. P. Graham. Patented Dec. 28, 1948. Low-methoxyl pectins are produced by subjecting an aluminum-pectin composition to partial deesterification by means of an enzyme. The products are useful for preparing low-sugar fruit gels and milk puddings and as coating materials.

PROTEINS, PLASTICS, FIBERS, ETC.

Inadequacy of proteolytic enzyme inhibition as explanation of growth depression by lima bean protein fractions. A. A. Klose, J. D. Greaves, and H. L. Fevold, Science 108(2795):88-89, July, 1948. Protein fractions of raw lima beans were prepared which strongly inhibited proteolytic action of trypsin in vitro and also depressed growth in rats on otherwise adequate diets. These fractions were fed to rats on diets containing, in one case, intact casein and, in the other case, completely acid-hydrolyzed casein as sole source of nitrogen. There was a pronounced and essentially equal depression of growth in the two cases. Ability of this lima bean fraction to inhibit growth in diets containing free amino acids as nitrogen source indicates that growth inhibition is not principally caused by inhibition of normal enzymatic hydrolysis of proteins to amino acids in the intestinal tract.

Method of dispersing keratin proteins with amides and the composition resulting therefrom. U. S. Patent 2,445,028 to C. B. Jones and D. K. Mecham. Patented July 13, 1948. Relates to solubilization of keratin materials such as feathers, hoof, horn, etc. whereby to produce products which can be used for preparation of artificial films, fibers, plastics, and the like. Process involves essentially heating the keratin in an aqueous solution containing an amide, such as urea, and a reducing agent, such as sodium bisulphite.

Method of dispersing keratin protein with ammonium thiocyanate and the composition resulting therefrom. U. S. Patent 2,445,029 to C. B. Jones and D. K. Mecham. Patented July 13, 1948. Relates to solubilization of keratin materials such as feathers, horn, hoof, etc. whereby to obtain products which can be used for preparation of artificial films, fibers, plastics, and the like. Process involves essentially heating the keratin in an aqueous solution containing ammonium thiocyanate and a reducing agent such as sodium bisulphite.

Reaction of formaldehyde with proteins. VI. Crosslinking of amino groups with phenol, imidazole, or indole groups. H. L. Fraenkel-Conrat and H. S. Olcott, Jour. Biol. Chem. 174(3):827-843, July, 1948. Tanning action of formaldehyde on proteins can probably be interpreted as resulting from introduction of methylene cross-links between amino groups on the one hand and primary amide or guanidyl groups on the other. Simple amines, amides, and guanidine derivatives can be introduced into proteins by means of this reaction. Ammonia or primary amines may act as crosslinking reagents for proteins containing many amide but few amino groups such as gliadin and zein.

*Science opens the door to lower costs. H. P. Lundgren, U. S. Egg and Poultry Magazine 54(7):8-9, 21-23, July, 1948. Discusses development of uses for chicken feathers particularly with regard to preparation of synthetic fibers from feathers.

The reaction of formaldehyde with proteins. V. Crosslinking between amino and primary amide or guanidyl groups. H. L. Fraenkel-Conrat and H. S. Olcott, Jour. Amer. Chem. Soc. 70(8):2673-2684, Aug., 1948. In neutral or slightly acid solution, formaldehyde introduces methylene bridges betwedn amines on one hand and reactive CH groups of phenolic and imidazole rings on the other. Phenols react to completion at room temperature. The linkage is resistant to acid hydrolysis. Condensations joining indoles, amines, and formaldehyde under similar conditions may occur through the NH group of the ring. These reactions take place also in proteins. They probably play a role in tanning action of formaldehyde, and possibly also in its alteration of the biological activities of proteins, as in formation of vaccines and toxoids. They represent means of introducing a great variety of reactive cyclic compounds stably into proteins.

Determination of the nitrogen content of proteins and amino acids containing refractory nitrogen by micro- and macrokjeldahl methods. L. M. White, G. E. Secor, and M. D. Carter, Jour. Assoc. Off. Agr. Chem. 31(3):657-662, Aug., 1948. Amino acids containing refractory nitrogen and a group of purified proteins rich in these acids were analyzed by the tentative micro-kjeldahl method employing mercuric oxide catalyst with an 80-minute digestion and also by the Official Kjeldahl-Gunning-Arnold macro method. Recovery of nitrogen from the amino acids was at least 98.5 percent complete by both methods.

Method of dispersing keratin proteins and the composition resulting therefrom. U. S. Patent 2,447,860 to C. B. Jones and D. K. Mecham. Patented Aug. 24, 1948. Relates to solubilization of keratin materials such as feathers, horn, hoof, etc. whereby to obtain products which can be used for preparation of artificial films, fibers, plastics, and the like. Process involves heating the keratin in an aqueous solution containing guanidine and a reducing agent, such as sodium bisulphite.

Isolation of lipovitellenin from egg yolk. Patented Nov. 30, 1948. U. S. Patent 2,454,915 to H. L. Fevold and A. L. Dimick. Lipovitellenin, a new protein of high phospholipid content, is isolated from egg yolks by a process involving centrifugation and ether extraction of the yolks.

Determination of moisture in some protein materials; use of Karl Fischer reagent. E. A. McComb, Analyt. Chem. 20(12):1219-1221, Dec., 1948. Fischer reagent has proved to be suitable for the determination of moisture in protein materials such as chicken feathers, dried egg white, gelatin, hog hair, etc.

ANTIBIOTIC SUBSTANCES

Isolation of subtilin from submerged cultures. H. L. Fevold, K. P. Dimick, and A. A. Klose, Arch. Biochem. 18(1):27-34, July, 1948. A chemical fractionation method for the purification of subtilin from submerged cultures of B. subtilis is described. The final product is obtained in 50-60 percent yield and appears to be essentially homogeneous.

Antifungal activity of hop resin constituents and a new method for isolation of lupulon. H. D. Michener, N. Snell, and E. F. Jansen, Arch. Biochem. 19(2): 199-208, Nov., 1948. The soft resin of hops was found to be active against 12 species of fungi. A new method of isolating lupulon from the soft resin is described. This method involves spontaneous crystallization from the resin, followed by recrystallization from 70 percent methanol.

Process for isolation of gramicidin. U. S. Patent 2,453,534 to H. S. Olcott and H. L. Fraenkel-Conrat. Patented Nov. 9, 1948. Relates to isolation of gramicidin, an antibiotic, from tyrothricin in which the gramicidin exists in admixture with tyrocidine. The isolation process involves treatment of the tyrothricin with phosphotungstic acid to precipitate the tyrocidine and recovery of the gramicidin from the remaining liquid.

MISCELLANEOUS

Esters of mucic acid. J. F. Carson, Jour. Amer. Chem. Soc. 70(7):2609, July, 1948. The preparation of several new esters of mucic acid is described, namely, propyl, butyl, amyl, hexyl, and allyl esters.

Isolation and spectrophotometric characterization of four carotene isomers. E. M. Bickoff, L. M. White, A. Bevenue, and K. T. Williams, Jour. Assoc. Off. Agr. Chem. 31(3):633-646, Aug., 1948. All-trans-alpha- and beta-carotenes, neo-beta-carotene U and neo-beta-carotene B have been prepared in the crystalline state. The details of isolation and purification are described.

Glycidyl esters. U. S. Patent 2,448,602 to E. B. Kester and H. M. Preusser. Patented Sept. 7, 1948. Process of preparing glycidyl esters by reacting a salt of a fatty acid, for example lauric, stearic, oleic, etc., with an excess of epichlorhydrin in the presence of an alkaline material. Products are useful as plasticizers for resins, particularly polyvinyl butyral resins.